

REMARKS

Claims in the case are 23-46 upon entry of this amendment. Claims 1-22 have been cancelled and Claims 23-46 have been added by amendment herein. Basis for added Claims 23-46 is found in original Claims 1-22.

The specification has been amended to include section headings, in accordance with accepted practice before the Office. The title of the application has been changed to correspond with a shortened version of the title of the related International Patent Publication No. WO 00/58072. Basis for the Brief Description of the Drawing inserted on page 2 of the specification by amendment herein, is found at page 3, lines 14-16 of the specification. Page 1 of the application has been amended herein to introduce cross reference information. The cross reference information is presented in accordance with 37 C.F.R. 1.78(a)(2) (Federal Register / Vol. 65, No. 183 / Wednesday, September 20, 2000; Changes to Implement Eighteen-Month Publication of Patent Applications; Final Rule). An abstract of the disclosure is also included herewith on a separate page.

The amendments and added claims presented herein are not believed to represent the entry of new matter into the application. Applicants respectfully request entry of this preliminary amendment.

Respectfully submitted,

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VERSIONS WITH MARKINGS TO SHOW CHANGES MADE

IN THE ABSTRACT:

The abstract has been replaced with the following.

--DEVICE AND METHOD FOR DEGASSING PLASTICS

ABSTRACT OF THE DISCLOSURE

An apparatus for degassing plastic materials, e.g., high molecular weight polycarbonate solutions, is described. The apparatus includes a double-shaft extruder having a length-to-diameter ratio of less than or equal to 40, which comprises: (i) two co-rotating and meshing shafts; (ii) an intake opening; and (iii) upstream and downstream portions relative to the intake opening. The shafts of the extruder are designed with a double lead in a degassing zone, and with a triple lead in a pressure build-up zone. Each of the degassing and the pressure build-up zones are down-stream from the intake opening, and the pressure build-up zone is further down-stream than the degassing zone. Also described is a process for degassing plastic materials, which involves providing the described double-shaft co-rotating extruder, into which plastic material is fed, processed and degassed. Entraining agents, such as nitrogen, and other processing additives may be introduced into extruder during the process of the present invention.--

An abstract is included herewith on a separate page.

IN THE SPECIFICATION: (Marked-Up)

The following are changes and additions made to the specification.

The title at lines 2 and 3 on page 1 of the application has been amended as follows.

[Apparatus and process for degassing plastic materials, in particular high-molecular polycarbonate solutions] **DEVICE AND METHOD FOR DEGASSING PLASTICS**

The following has been inserted between lines 2 and 5 on page 1 of the specification.

--CROSS REFERENCE TO RELATED PATENT APPLICATIONS

The present patent application claims the right of priority under 35 U.S.C. 119 (a)-(d) and 35 U.S.C. 365 of International Application No. PCT/EP00/02240, filed 14 March 2000, which was published in German as International Patent Publication No. WO 00/58072 on 5 October 2000, which is entitled to the right of priority of German Patent Application No. 199 14 143.6, filed 27 March 1999.

FIELD OF THE INVENTION--

The following has been inserted at line 9 on page 1 of the specification.

--BACKGROUND OF THE INVENTION--

The following has been inserted at line 35 on page 1 of the specification.

--SUMMARY OF THE INVENTION--

The following has been inserted between lines 7 and 9 on page 2 of the specification.

--BRIEF DESCRIPTION OF THE DRAWING

Figure 1 is a schematic representation of a longitudinal section of a double-shaft extruder of an apparatus according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION--

Line 1 of page 5 of the specification has been amended as follows.

[Claims] WHAT IS CLAIMED IS:

IN THE CLAIMS:

Claims 1-22 have been cancelled without prejudice.

The following Claims 23-46 have been added.

--23. An apparatus for degassing plastic materials comprising a double-shaft extruder, said double shaft extruder comprising:

- (i) two shafts rotating in the same direction and meshing with one another;
- (ii) an intake opening; and
- (iii) upstream and downstream portions relative to said intake opening,

wherein the extruder has a length-to-diameter ratio of less than or equal to 40, the shafts of the extruder are designed with a double lead in a degassing zone of the extruder, and with a triple lead in a pressure build-up zone of the extruder, each of said degassing zone and said pressure build-up zone being down-stream from said intake opening, and said pressure build-up zone being further down-stream than said degassing zone.

24. The apparatus of Claim 23 wherein the length-to-diameter ratio is from 35 to 40.

25. The apparatus of Claim 23 wherein said extruder further comprises a cooling device defining a cooling zone.

26. The apparatus of Claim 25 wherein the shafts are designed with a triple lead in the cooling zone.

27. The apparatus of Claim 23 wherein kneading elements are disposed immediately downstream from said intake opening, said kneading elements being located between feed elements of said shafts.

28. The apparatus of Claim 23 wherein said extruder comprises a plurality of degassing zones located downstream from said intake opening, each of said degassing zones having an exhausting device connected thereto.

29. The apparatus of Claim 28 wherein the shafts have a triple-lead profile in a region between two of said degassing zones.

30. The apparatus of Claim 28 wherein said extruder further comprises an agent inlet located in a region between two of said degassing zones.

31. The apparatus of Claim 28 wherein said extruder comprises first, second and third degassing zones, and an entraining agent inlet located between the second and third degassing zones.

32. The apparatus of Claim 23 wherein a backward degassing vent opening is located upstream from said intake opening.

33. The apparatus of Claim 28 wherein said plurality of degassing zones comprises a last degassing zone located furthest downstream from said intake opening, said extruder further comprising an additive admixing charging device located in said last degassing zone.

34. A process for degassing a plastic material comprising:

(a) providing a double-shaft extruder comprising,

- (i) two shafts rotating in the same direction and meshing with one another,
- (ii) an intake opening, and
- (iii) upstream and downstream portions relative to said intake opening,

wherein the extruder has a length-to-diameter ratio of less than or equal to 40, the shafts of the extruder are designed with a double lead in a degassing zone of the extruder, and with a triple lead in a pressure

build-up zone of the extruder, each of said degassing zone and said pressure build-up zone being down-stream from said intake opening, and said pressure build-up zone being further down-stream than said degassing zone; and

- (b) feeding said plastic material into said intake opening.

35. The process of Claim 34 wherein the length-to-diameter ratio of the extruder is from 35 to 40.

36. The process of Claim 34 wherein said extruder further comprises a cooling device defining a cooling zone.

37. The process of Claim 36 wherein the shafts are designed with a triple lead in the cooling zone.

38. The process of Claim 34 wherein said extruder comprises a plurality of degassing zones located downstream from said intake opening, each of said degassing zones having an exhausting device connected thereto, said degassing zones defining a plurality of forward degassing zones.

39. The process of Claim 38 wherein said extruder further comprises a backward degassing vent opening located upstream from said intake opening.

40. The process of Claim 38 wherein said extruder comprises first, second and third degassing zones, the absolute pressure generated by the exhausting device of said first degassing zone being from 0.5 to 1.5 bar, the absolute pressure generated by the exhausting device of said second degassing zone being from 0.03 to 1.9 bar, and the degassing pressure generated by the exhausting device of said third degassing zone being from 0.001 to 0.03 bar.

41. The process of Claim 34 further comprising admixing an entraining agent into the plastic material within said extruder.

42. The process of Claim 38 wherein said extruder comprises first, second and third degassing zones and an entraining agent is introduced into the plastic material within said extruder between said second and third degassing zones.

43. The process of Claim 42 wherein said entraining agent is nitrogen.

44. The process of Claim 43 wherein the shafts of said extruder are rotated at a speed of less than 390 revolutions per minute, and said entraining agent is introduced into said extruder at a volume rate of 2 to 10 Nm³/h.

45. The process of Claim 38 wherein said plurality of degassing zones comprises a last degassing zone located furthest downstream from said intake opening, and said pressure build-up zone is adjoined to said last degassing zone.

46. The process of Claim 34 wherein said plastic material is a high-molecular polycarbonate solution.--